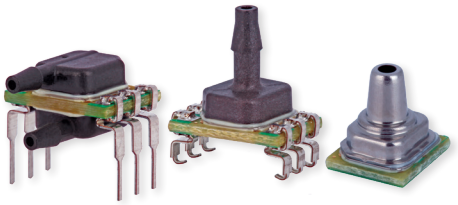
ABP2 SERIES PRESSURE SOLUTIONS FOR HEALTHIER AIR

Application Brief

Honeywell

The hidden epidemic – the World Health Organization's so-called "world's largest single environmental health risk" [1] – of the impact of poor air quality has risen within public and business consciousness over the past few years.



Honeywell ABP2 Series Board-Mount Pressure Sensors

Surprisingly, much of the threat comes from within our homes and places of work, where key pollutant concentrations can be up to 5 times higher than outdoors[2]. With good air quality linked to better occupant health, fewer sick days, and productivity gains of up to 15 % [3], the air filtration and measurement systems of tomorrow are set to deliver tangible benefits and cost savings through smart measurement, helping you and your customers to breathe easier.

The Honeywell ABP2 Series board mount pressure sensing family are supporting the next generation of air filtration systems to monitor and improve air quality within buildings. As filters become clogged with use, their performance is reduced, and the internal fan needs to work harder to keep the system operational, consuming more power in the process. With their high accuracy and reliability, ABP2 sensors are vital for providing advance warning of the build-up of dust and debris on the filters, assisting maintenance teams to schedule preventative maintenance to replace or clean filters and reducing the amount of power drawn by the fan. Within this portfolio, the new ABP2 Ultra-Low-Pressure (ULP) sensors are at the cutting edge of differential sensing capabilities. In a clogged filter detection application, where precision measurement is imperative, ABP2 ULP sensors enable air filtration and purification systems to be fine-tuned to meet alert thresholds. The long-term stability and reliability of these sensors also minimises costly system down time and repairs on critical building environmental system infrastructure.

CLOGGED FILTER & AIRFLOW MEASUREMENTS

Honeywell ABP2 pressure sensors enable precise air pressure measurement differences across both the upstream and downstream sides of a filter. The ABP2 differential pressure sensor is equipped with two pressure ports: the ABP2 P1 port connects to the input of the filter or restrictor, while the ABP2 P2 port connects to the output of the filter or restrictor.

When the filter is in optimal condition, there is minimal pressure difference across it. However, as the filter becomes clogged, pressure builds up. As the clogging increases, the fan or blower must work harder to push air through the filter, leading to increased power consumption. If the filter is not maintained, the input pressure may rise to a level that could cause the filter to rupture, potentially allowing contaminants into the building. The ABP2 sensor monitors the condition of the filter and alerts the building controller when replacement or cleaning of the filter is necessary.

For airflow measurements, the filter is replaced with a restrictor that creates a known pressure difference. The size of the restrictor is determined based on the expected airflow rate within that part of the device or ventilation ducting.

It is important to note that both clogged filter and airflow measurements using a restrictor typically involve measuring very small pressure differences (2.5 mbar to 25 mbar/2 inH_2O to 10 inH_2O), which fall within the low end of the ultra-low-pressure range.

Figure 1. Airflow Measurement

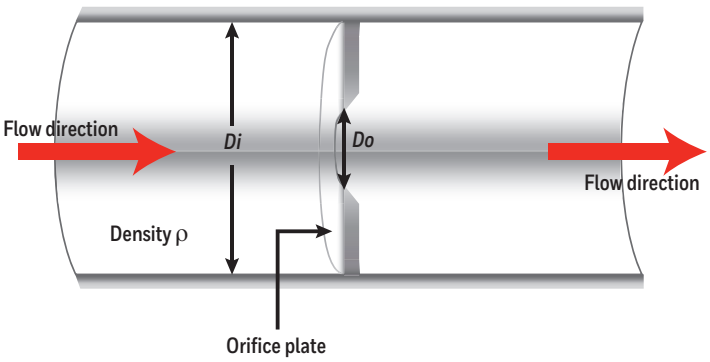
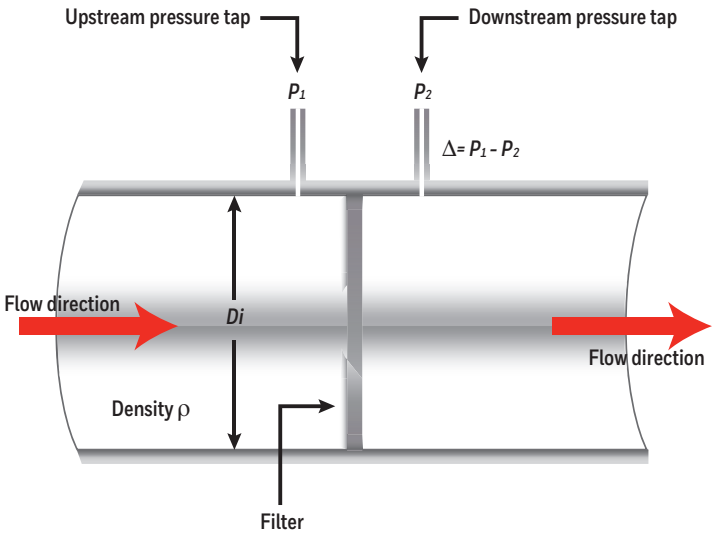
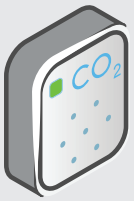


Figure 2. Clogged Filter Measurement

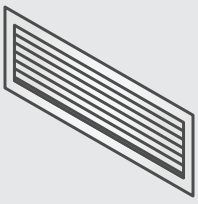


CLEANER AIR DEVICES AND SUBSYSTEMS



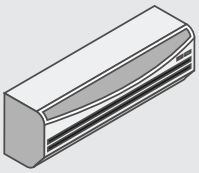
Indoor Air Quality Monitors

ABP2 monitors the volume of air passing thru the particle sensing element to improve accuracy of air quality measurements



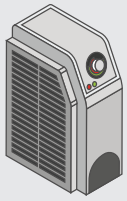
Air Filtration

ABP2 detects when filter is becoming clogged and needs to be replaced, ensuring airflow is not restricted



Air Conditioning Systems

ABP2 detects when filter is becoming clogged and needs to be replaced, ensuring airflow is not restricted



Air Purifier

ABP2 detects when filter is becoming clogged and needs to be replaced, ensuring airflow is not restricted

VAV Control/Demand Control Ventilation

ABP2 monitors and airflow within ventilation ducting (adjusting valve positioning) to prevent hot and cold spots within the build

VAV Control/Demand Control Ventilation

ABP2 can be used in instruments and handheld devices used for testing and calibration of HVAC devices

ABP2 SENSOR OVERVIEW

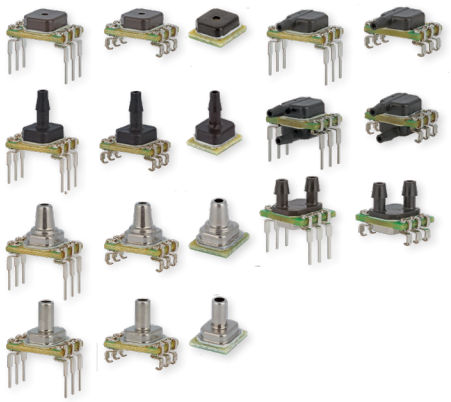
Honeywell ABP2 portfolio strength lies in its high performance and wide range of available configuration options, assisting OEMs to simplify their design process.

High accuracy in pressure measurement is essential for ensuring optimal performance and reliability, and the new ABP2 ULP sensors offer low errors of as low as 2 % full scale span within standard operating conditions. This enables air filtration systems to be fine-tuned for precise and efficient operation.

ABP2 Series' differential sensing options with dual port configurations also provide a hidden advantage. By offsetting the upstream pressure against the downstream pressure on the same die, a differential sensor removes one of the key sources of measurement error – relative offsets. In contrast, differential measurements conducted by comparing the outputs of two individual sensors are vulnerable to the sums of the errors induced by each.

Consistent and reliable performance over the system's service life is vital to minimize downtime and performance inefficiencies. The ABP2 ULP sensors boast long-term stability and reliability, ensuring sustained efficiency and reducing the risk of costly repairs. Engineered for the long-term, ABP2 ULP sensors undergo accelerated life cycle analysis in our factory to verify compliance with our strict internal quality standards.

Ultimately, ABP2 ULP sensors are highly accurate, robust, and very versatile, making them ideal for clogged filter detection and airflow measurements. The high accuracy of ABP2 ULP sensors ensures that air filtration, purification, and fume extraction systems can be precisely calibrated to meet specific performance criteria, leading to improved air quality, energy efficiency, and cost savings.



ABP2 SERIES ULP AT A GLANCE

- Pressure (gage): 5 mbar (2 inH_2O) and above
- Pressure (differential): ± 2.5 mbar (1 inH_2O) and above
- Total error: As low as 1.5 % FSS
- Stability: <0.3 % over 1000 hrs
- Operating temperature: -20°C to 110°C
- Ports: Multiple options, including dual axial and dual radial
- Outputs: Analog, SPI, I^2C

ABP2 SENSOR CATALOG LISTINGS FOR HEALTHIER AIR SOLUTIONS

Below are some recommended parts for clogged filter detection and airflow measurements.

TABLE 1. RECOMMENDED PARTS FOR HEALTHIER AIR

PART NUMBER	DESCRIPTION
ABP2MRRN001ND2A3XX	ABP2, 1 inH_2O [2.5 mbar], differential, SMT, dual radial ports, digital I²C, 3.3 Vdc, dry gases
ABP2MRRN001NDSA3XX	ABP2, 1 inH_2O [2.5 mbar], differential, SMT, dual radial ports, digital SPI, 3.3 Vdc, dry gases
ABP2MRRN001NDAA3XX	ABP2, 1 inH_2O [2.5 mbar], differential, SMT, dual radial ports, analog, 3.3 Vdc, dry gases
ABP2MRRN001NDAA5XX	ABP2, 1 inH_2O [2.5 mbar], differential, SMT, dual radial ports, analog, 5.0 Vdc, dry gases
ABP2MDAN001ND2A3XX	ABP2, 1 inH_2O [2.5 mbar], differential, SMT, dual axial ports, digital I²C, 3.3 Vdc, dry gases
ABP2MDAN001NDSA3XX	ABP2, 1 inH_2O [2.5 mbar], differential, SMT, dual axial ports, digital SPI, 3.3 Vdc, dry gases
ABP2MDAN001NDAA3XX	ABP2, 1 inH_2O [2.5 mbar], differential, SMT, dual axial ports, analog, 3.3 Vdc, dry gases
ABP2MDAN001NDAA5XX	ABP2, 1 inH_2O [2.5 mbar], differential, SMT, dual axial ports, analog, 5.0 Vdc, dry gases
ABP2MRRN002ND2A3XX	ABP2, 2 inH_2O [5 mbar], differential, SMT, dual radial ports, digital I²C, 3.3 Vdc, dry gases
ABP2MRRN002NDSA3XX	ABP2, 2 inH_2O [5 mbar], differential, SMT, dual radial ports, digital SPI, 3.3 Vdc, dry gases
ABP2MRRN002NDAA3XX	ABP2, 2 inH_2O [5 mbar], differential, SMT, dual radial ports, analog, 3.3 Vdc, dry gases
ABP2MRRN002NDAA5XX	ABP2, 2 inH_2O [5 mbar], differential, SMT, dual radial ports, analog, 5.0 Vdc, dry gases
ABP2MDAN002ND2A3XX	ABP2, 2 inH_2O [5 mbar], differential, SMT, dual axial ports, digital I²C, 3.3 Vdc, dry gases
ABP2MDAN002NDSA3XX	ABP2, 2 inH_2O [5 mbar], differential, SMT, dual axial ports, digital SPI, 3.3 Vdc, dry gases
ABP2MDAN002NDAA3XX	ABP2, 2 inH_2O [5 mbar], differential, SMT, dual axial ports, analog, 3.3 Vdc, dry gases
ABP2MDAN002NDAA5XX	ABP2, 2 inH_2O [5 mbar], differential, SMT, dual axial ports, analog, 5.0 Vdc, dry gases
ABP2MRRN004ND2A3XX	ABP2, 4 inH_2O [10 mbar], differential, SMT, dual radial ports, digital I²C, 3.3 Vdc, dry gases
ABP2MRRN004NDSA3XX	ABP2, 4 inH_2O [10 mbar], differential, SMT, dual radial ports, digital SPI, 3.3 Vdc, dry gases
ABP2MRRN004NDAA3XX	ABP2, 4 inH_2O [10 mbar], differential, SMT, dual radial ports, digital SPI, 3.3 Vdc, dry gases
ABP2MRRN004NDAA5XX	ABP2, 4 inH_2O [10 mbar], differential, SMT, dual radial ports, digital SPI, 5.0 Vdc, dry gases
ABP2MRRN004NDSA3XX	ABP2, 4 inH_2O [10 mbar], differential, SMT, dual axial ports, digital I²C, 3.3 Vdc, dry gases
ABP2MRRN004NDSA3XX	ABP2, 4 inH2O [10 mbar], differential, SMT, dual axial ports, digital SPI, 3.3 Vdc, dry gases
ABP2MDAN004NDAA3XX	ABP2, 4 inH2O [10 mbar], differential, SMT, dual axial ports, analog, 3.3 Vdc, dry gases
ABP2MDAN004NDAA5XX	ABP2, 4 inH2O [10 mbar], differential, SMT, dual axial ports, analog, 5.0 Vdc, dry gases

[1] https://www.who.int/news/item/25-03-2014-7-million-premature-deaths-annually-linked-to-air-pollution

[2] https://www.epa.gov/report-environment/indoor-air-quality

[3] https://www.cbi.org.uk/articles/air-quality-in-the-workplace/

⚠WARNING IMPROPER INSTALLATION

- Consult with local safety agencies and their requirements when designing a machine control link, interface and all control elements that affect safety.
- Strictly adhere to all installation instructions.

Failure to comply with these instructions could result in death or serious injury.

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship during the applicable warranty period. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items that Honeywell, in its sole discretion, finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While Honeywell may provide information or engineering support for its products through Honeywell personnel, literature and website, it is the buyer's sole responsibility to determine the suitability of the Honeywell product(s) for the buyer's requirements.

Specifications may change without notice. The information we supply is believed to be accurate as of this writing. However, Honeywell assumes no responsibility for its use.

For more information

Honeywell Sensing Solutions services its customers through a worldwide network of sales offices and distributors. For application assistance, current specifications, pricing, or the nearest Authorized Distributor, visit our website or call:

USA/Canada	+1 302 613 4491
Latin America	+1 305 805 8188
Europe	+44 1344 238258
Japan	+81 (0) 3-6730-7152
Singapore	+65 6355 2828
Greater China	+86 4006396841

Honeywell Sensing Solutions
830 East Arapaho Road
Richardson, TX 75081
www.honeywell.com

00XXXX-1-EN | 1 | 03/25

Honeywell